

What is claimed is:

1. A transmission screen comprising:

5 a Fresnel lens sheet through which light is projected from a projector to a
lenticular lens sheet arranged on a viewer side, as approximately parallel light; and
the lenticular lens sheet receiving light passing through the Fresnel lens sheet,
and emitting the approximately parallel light while horizontally widening, by means of a
group of cylindrical lenses which are horizontally in parallel,
wherein in at least one of the Fresnel lens sheet and the lenticular lens sheet, on
10 a surface of a light diffusing substrate, in which a light diffusing material is dispersed,
irregularities which constitute a lens section are formed, and
in the light diffusing substrate, dispersion density of the light diffusing material
differs in at least two layers in the thickness direction.

15 2. A transmission screen according to claim 1, wherein the light diffusing substrate is
spread formed with ink containing the light diffusing material on at least one surface of a
resin sheet extrusion formed with the light diffusing material mixed therein.

3. A transmission screen according to claim 1, wherein the light diffusing substrate has
20 laminated on the surface of the resin sheet extrusion formed with the light diffusing
material mixed therein, another resin sheet extrusion formed with a different density of
the light diffusing material mixed therein.

4. A transmission screen according to claim 1, wherein on one surface of a transparent
25 resin substrate which does not contain the light diffusing material, at least two layers of

resin layers containing the light diffusing material is laminated.

5. A transmission screen according to claim 1, wherein the dispersion density of the light diffusing material is higher on the side of the projector than on the viewer side.

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6. A transmission screen according to claim 1, wherein in a multilayer configuration of the at least two layers, the light diffusing material dispersed on the side of the projector is mainly composed of an inorganic material, and the light diffusing material dispersed on the viewer side is mainly composed of an organic material.

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7. A transmission screen according to claim 1, wherein the light diffusing material dispersed on the Fresnel lens sheet side is an organic material, and the light diffusing material dispersed on the lenticular lens sheet side is an inorganic material.

15 8. A transmission screen according to claim 1, wherein the surface on the viewer side of the light diffusing substrate, is performed to at least one surface treatment selected from hard coat treatment, antistatic treatment, and antireflection treatment.

9. A transmission screen according to claim 1, wherein the surface on the viewer side
20 of the resin sheet extrusion formed with the light diffusing material mixed therein, is performed to at least one surface treatment selected from hard coat treatment, antistatic treatment, and antireflection treatment.

10. A transmission screen comprising:
25 a Fresnel lens sheet through which light is projected from a projector to a

lenticular lens sheet arranged on a viewer side, as approximately parallel light; and

the lenticular lens sheet receiving light passing through the Fresnel lens sheet, and emitting the approximately parallel light while horizontally widening, by means of a group of cylindrical lenses which are horizontally in parallel,

5 wherein in the Fresnel lens sheet on one surface of a light diffusing substrate, in which a light diffusing material is dispersed, irregularities which constitute a lens section including a reacted product of a radioactive-ray-curable-resin is formed, and on the other surface, irregularities which constitute a lens section which light is vertically widened and projected from the projector is formed, by means of a group of the cylindrical lenses
10 which are vertically in parallel, and

in the lenticular lens sheet, on one surface of a substrate on the Fresnel lens sheet side, the group of cylindrical lenses which are horizontally in parallel is formed by a reacted product of a radioactive-ray-curable-resin, and on the other surface, at a position corresponding to the boundaries of the cylindrical lenses, a stripe-shaped

15 shading layer is formed, and

a light diffusing substrate made by laminating at least two layers of resin layers containing the light diffusing material on one surface of a transparent resin substrate which does not contain the light diffusing material, is laminated so that the side which does not contain the light diffusing material faces to the shading layer side, and

20 in the resin layer, a dispersion density of the light diffusing material differs in at least two layers in the thickness direction.

11. A transmission screen comprising:

a Fresnel lens sheet through which light is projected from a projector to a

25 lenticular lens sheet arranged on a viewer side, as approximately parallel light; and

the lenticular lens sheet receiving light passing through the Fresnel lens sheet, and emitting the approximately parallel light while horizontally widening, by means of a group of cylindrical lenses which are horizontally in parallel,

wherein the lenticular lens sheet is formed with irregularities which constitute a
5 lens section on the surface of a light diffusing substrate having a light diffusing layer,
the light diffusing substrate is mainly composed of an organic material,
the light diffusing layer contains at least two kinds of light diffusing material
which differ at least in any one of shape, mean particle diameter, and material, and
at least one kind of light diffusing material of the light diffusing materials
10 comprises an inorganic material.

12. A transmission screen according to claim 11, wherein in the case where the shapes
of at least two kinds of light diffusing material contained in the light diffusing layer are
globular, the light diffusing layer contains a first light diffusing material with a mean
15 particle diameter satisfying a range of 1 to 10 μm and a second light diffusing material
with a mean particle diameter satisfying a range of 20 to 50 μm .

13. A transmission screen according to claim 11, wherein in the case where at least one
kind of light diffusing material contained in the light diffusing layer comprises an organic
20 material, the mean particle diameter of the organic light diffusing material is larger than
the mean particle diameter of an inorganic diffusing agent where the light diffusing
material comprises an inorganic material.

14. A transmission screen according to claim 11, wherein the at least two kinds of light
25 diffusing material which differ at least in any one of shape, mean particle diameter, and

material, contained in the light diffusing layer, further contain an inorganic light diffusing material of irregular shape.

15. A transmission screen according to any one of claim 1, 10 and 11, wherein a
5 refractive index of a resin constituting the light diffusing substrate is higher than a refractive index of the light diffusing material.

16. A transmission screen according to claim 15, wherein a refractive index ratio of the
resin and the light diffusing material is in a range of resin : light diffusing material = 1 :
10 0.7 to 1.

17. A transmission screen according to claim 15, wherein a refractive index difference
of the resin and the light diffusing material is in a range of 0 to 0.2.

15 18. A transmission screen according to claim 15, wherein a thickness of the light
diffusing layer is in a range of 1 to 60 μm .

19. A transmission screen according to claim 15, wherein a dosage of the light
diffusing material is in a range of 5 to 40 parts by weight for 100 parts by weight of the
20 light diffusing layer.

20. A transmission screen according to claim 15, wherein a mean particle diameter of
the light diffusing material is in a range of 1 to 30 μm , and a standard deviation of the
mean particle diameter according to a laser diffraction scattering method is less than 6
25 μm .

21. A display device of a type which forms a display light by projecting an illumination light onto image display elements in which a display image is regulated by transmission/non transmission (or, transmission /light diffusion) or selective reflection,
5 equipped with a transmission screen according to any one of claim 1, 10 and 11, either alone or in combination with another lens sheet.
22. A light diffusing substrate comprising a light diffusing layer made by dispersing and mixing a light diffusing material into a resin,
10 wherein in the light diffusing layer, a dispersion density of the light diffusing material differs in at least two layers in the thickness direction.
23. A light diffusing substrate comprising a light diffusing layer made by dispersing and mixing a light diffusing material into a resin,
15 wherein the light diffusing substrate is mainly composed of an organic material, the light diffusing layer contains at least two kinds of light diffusing material which differ at least in any one of shape, mean particle diameter, and material, and at least one kind of light diffusing material of the light diffusing materials comprises an inorganic material.
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